

## *PSEUDOPANDARUS AUSTRALIS*, A NEW SPECIES OF PANDARID COPEPOD FROM AUSTRALIAN SHARKS

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*Abstract.*—*Pseudopandarus australis* is described from 5 species of sharks from the east coast of Australia. It differs from other known species of *Pseudopandarus* by the presence of only 1 small spine on the endopod of the first leg.

In 1950 Kirtisinghe described a new genus and species of pandarid copepod, *Pseudopandarus gracilis*. Gnanamuthu (1951) described a second species, *P. longus*, and Rangnekar and Rangnekar described *P. bombayensis* and *P. shiinoi* from Bombay in 1972. Until now all species were known only from the Indian Ocean and Japan. The second author recently collected a fifth species from 2 species of *Rhizoprionodon* from waters off Townsville, North Queensland, Australia. This new species is the first *Pseudopandarus* reported from the South Pacific.

*Pseudopandarus australis*, new species

Figs. 1-21

*Material examined.*—12 females (3 immature) and 3 males from *Rhizoprionodon acutus*, and 3 females from *R. taylori* out of Cleveland Bay and Townsville Harbour, Queensland, Australia. Other material was collected by C.S. from other hosts (see remarks) but not examined for this description. Holotype from *R. taylori* and para-

types from *R. acutus* are deposited in the Australian Museum except for 2 paratypes from *R. acutus* deposited in the National Museum of Natural History (USNM) Smithsonian Institution, Washington, D.C. (USNM 234429).

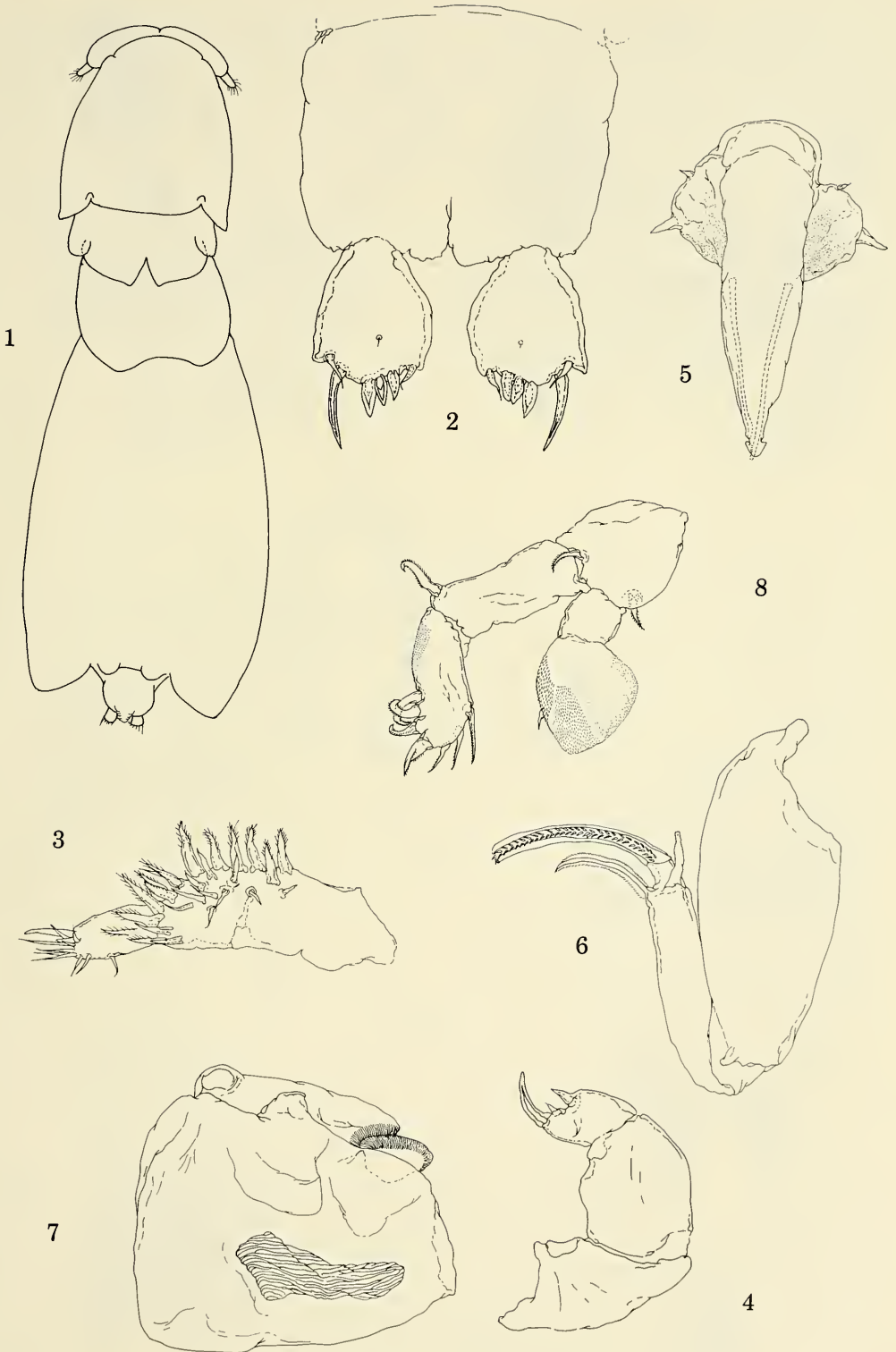
*Female.*—Body form as in Fig. 1. Total length 4.43 mm. Greatest width at genital segment 1.32 mm. Cephalon somewhat longer than wide (1.2 × 0.9 mm). Genital segment longer than wide (1.98 × 1.32 mm). Two dorsal thoracic plates between cephalon and genital segment. Abdomen (Fig. 2) small, somewhat wider than long (329 × 272 μm). Caudal rami (see Fig. 2) somewhat triangular, widest posteriorly, somewhat longer than wide (103 and 85 μm) and bearing an outer short seta and 5 terminal spines.

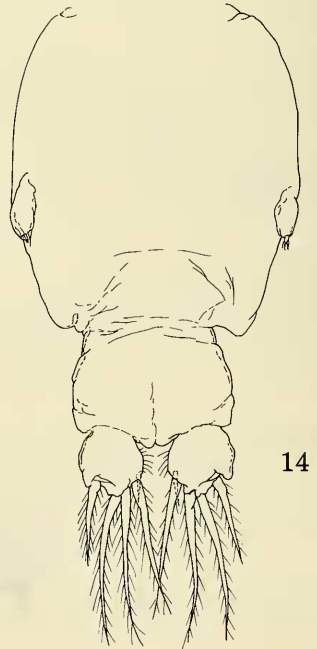
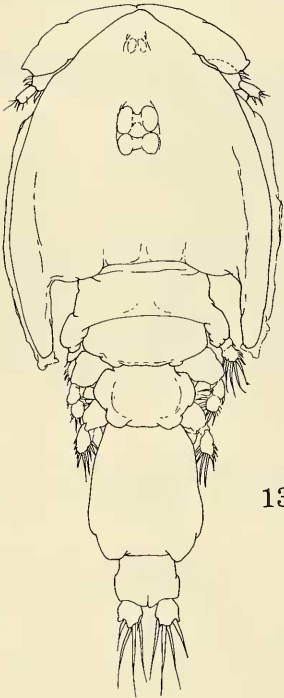
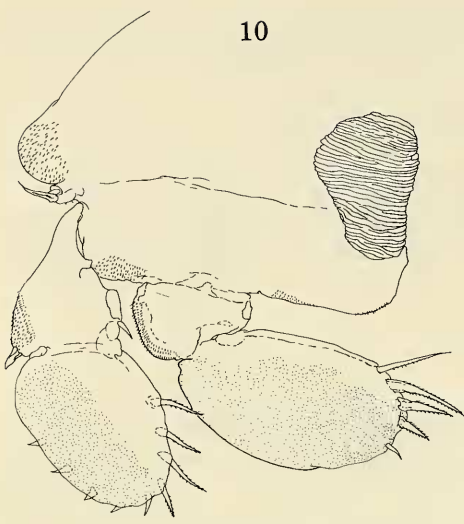
First antenna (Fig. 3) 2-segmented, bearing 13 plumose and 11 naked setae on first segment and 3 lateral and 9 terminal setae on second segment. Second antenna (Fig. 4) 3-segmented, terminal segment bearing 1 stout recurved spine and 2 shorter terminal spines. Mouth tube (Fig. 5) triangular, much longer than wide. First maxillae at base of

Figs. 1-8. *Pseudopandarus australis*, female: 1, Dorsal; 2, Abdomen and caudal rami, ventral; 3, First antenna; 4, Second antenna; 5, First maxillae and mouth tube; 6, Second maxilla; 7, Maxilliped; 8, First leg.

Figs. 9-14. *Pseudopandarus australis*, 9-12 female: 9, Second leg; 10, Third leg; 11, Fourth leg; 12, Fifth leg. 13-14 Male: 13, Dorsal; 14, Genital segment, abdomen, and caudal rami, ventral.

Figs. 15-21. *Pseudopandarus australis*, male: 15, Abdomen and caudal rami, ventral; 16, Second maxilla; 17, Maxilliped; 18, First leg; 19, Second leg; 20, Third leg; 21, Fourth leg.





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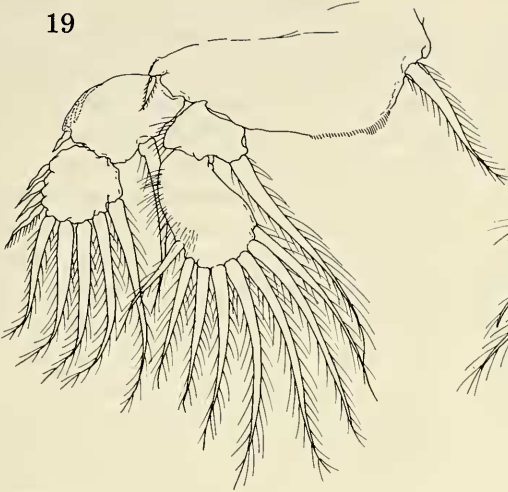
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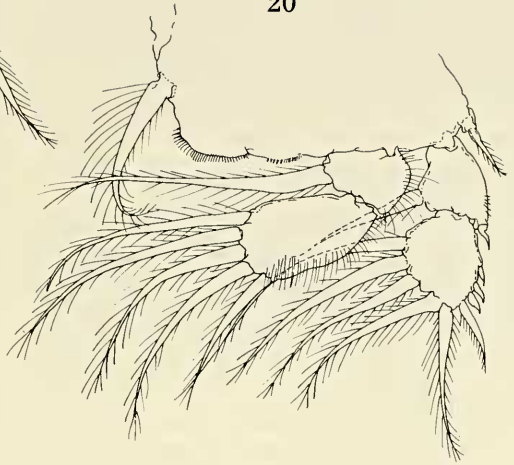
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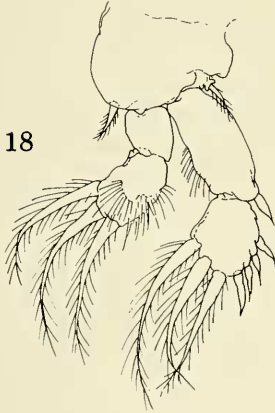
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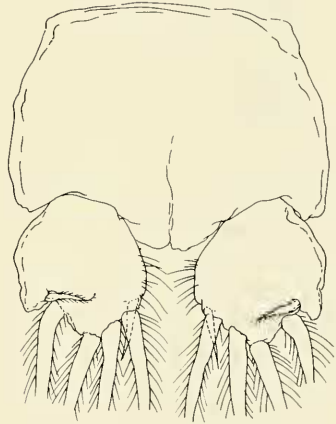
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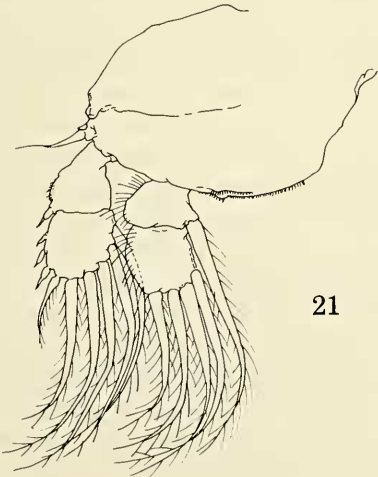


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mouth tube (Fig. 5), each composed of a lateral projection bearing 2 short spines. Second maxilla (Fig. 6) with robust basal segment, and slender second segment bearing 1 toothed terminal spine, 1 subterminal shorter fringed spine, and 1 subterminal membranous process. Maxilliped (Fig. 7) robust and armed as in the figure.

Leg 1 (Fig. 8) with 2 short setae on basipod; exopod 2-segmented, first segment about twice as long as wide and bearing a short seta at outer distal corner, second segment with 7 outer to inner setae around distal third, setae armed with short spinules as in the figure; endopod 2-segmented, first segment short, unarmed, second segment about twice as long and wide as first and with 1 very small seta on mid-outer edge and 2 patches of spinules (outermost heavier than midpatch, inner patch finest). Leg 2 (Fig. 9) rami 2-segmented, exopod first segment with outer distal spine, last segment with 9 spines, 2 terminalmost very short; endopod first segment without setae, last segment with 7 setae, lateralmost 3 very short; both rami armed with patches of spinules as in the figure. Leg 3 (Fig. 10) similar to leg 2 except endopod last segment with only 5 setae. Leg 4 (Fig. 11) rami 1-segmented, exopod about twice as long as wide, bearing 10 setae from outer to inner margins; endopod with 3 terminal setae; leg armed with patches of spinules as in the figure. Leg 5 (Fig. 12) a small, palplike process bearing 4 setae, attached to ventral surface of genital segment lateral to origin of abdomen.

*Male*.—Body form as in Fig. 13. Total length 1.91 mm. Cephalon longer than wide ( $1.17 \times 0.93$  mm). Genital segment (Fig. 14) somewhat longer than wide ( $0.40 \times 0.37$  mm). Abdomen (Fig. 15) wider than long ( $0.21 \times 0.19$  mm). Caudal rami (see Fig. 15) slightly longer than wide ( $0.1 \times 0.08$  mm), longest seta 0.23 mm.

Cephalic appendages as in female except second maxilla (Fig. 16) with only 2 terminal processes, longest process with lateral

fringes rather than spinules as in female, third membranous process (in female) absent. Maxilliped (Fig. 17) robust as in the female but without rugose areas present in female, a membranous spine on terminal claw not seen in female.

Leg 1 (Fig. 18) exopod 2-segmented; first segment bearing a naked spine at outer distal corner; last segment bearing 4 outer, naked spines and 3 terminal plumose setae; endopod 2-segmented; first segment unarmed, last segment with 3 plumose setae. Leg 2 (Fig. 19) exopod 2-segmented; first segment with an outer distal spine and an inner seta, last segment with 3 short, naked outer setae, a longer spinule plumose on inner margin and 5 terminal to inner plumose setae; endopod first segment with a long, plumose inner seta, last segment with 8 terminal plumose setae. Leg 3 (Fig. 20) exopod as in leg 2 except rugose area on outer margin of first segment lacking; endopod as in leg 2 except last segment with 5 plumose setae (8 in leg 2). Leg 4 (Fig. 21) as in leg 3 except endopod last segment with only 4 plumose setae.

*Remarks*.—Females of the new species can be separated from the 4 known species by the presence of only 1 small spine on the endopod of the first leg (*gracilis*-3), (*longus*-3), (*bombayensis*-3), (*shiinoi*-2), and by the presence of 3 setae on the endopod of the fourth leg (*gracilis*-2), (*longus*-5), (*bombayensis*-4), (*shiinoi*-5). In general, the new species appears to be most closely related to *P. longus* which is known, so far, only from South Africa and Ceylon. *Pseudopandarus longus* has been reported from *Rhizoprionodon*, the same genus of sharks from which this new species is reported from the east coast of Australia. *Pseudopandarus australis* has been taken from 5 species of sharks, *Rhizoprionodon acutus*, *R. taylori*, *Carcharhinus dussumieri*, *Hemigaleus microstoma*, and *Sphyrna lewini*. Rates of infestation by the female parasites are high for both species of *Rhizoprionodon* (*R. acutus* 57.2% and *R. taylori* 47.4%), but is only

minor for the other species (less than 5%). Males occur only rarely (about 5%) on *Rhizoprionodon* spp. and *H. microstoma*, and have not been recorded from the other species. Attachment of the females to the host is commonly in the pectoral, pelvic, and caudal regions, while males have been found attached on the flanks and nape.

*Etymology.*—*australis* alludes to the discovery of this new species from the east coast of Australia.

#### Literature Cited

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